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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/050,134 | 01/18/2002 | Yoichi Asano | Q68111 | 3810 |
| 7590 | 04/06/2004 | | EXAMINER | |
| SUGHRUE MION, PLLC 2100 Pennsylvania Avenue, NW Washington, DC 20037-3213 | | | | YUAN, DAH WEI D |
| | | ART UNIT | PAPER NUMBER | 1745 |

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

| | | |
|------------------------------|--|---|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/050,134 Examiner Dah-Wei D. Yuan | ASANO ET AL. Art Unit 1745 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 17 February 2004.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-40 is/are pending in the application.
 - 4a) Of the above claim(s) 13-40 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-3,5-7 and 9-11 is/are rejected.
- 7) Claim(s) 4,8 and 12 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 January 2002 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

**POLYMER ELECTROLYTE MEMBRANE, METHOD FOR PRODUCING SAME, AND
MEMBRANE ELECTRODE ASSEMBLY AND POLYMER ELECTROLYTE
FUEL CELL COMPRISING SAME**

Examiner: Yuan S.N. 10/050,134 Art Unit: 1745 March 29, 2004

Detailed Action

1. The Applicant's Request for Reconsideration filed on February 17, 2004 was received.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on November 17, 2003.

Claim Rejections - 35 USC § 102

3. The claim rejections under 35 U.S.C.102(b) as being anticipated by Nolte et al. on claims 1,2,5,6,9,10 are maintained. The rejection is repeated below for convenience.

With respect to claim 1,2,6,10, Nolte et al. teach a polymer electrolyte membrane of sulfonated poly(arylene ether sulfones) with various sulfonation levels. Figure 2 shows structure of the polymer membrane having aromatic functional groups. The sulfonated poly(arylene ether sulfones) is also treated in hot water (ca. 80°C). See Abstract, pages 211-213. Nolte et al. do not specifically disclose the maximum water absorption in a range of 80-300 weight% based on its dry weight before the hot water treatment. However, it is the position of the examiner that such properties are inherent, given that the materials recited in both Nolte et al. and the present application having similar chemistry and chemical structure. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 5, Nolte et al. further teach the polymer electrode membrane is sandwiched between two electrode/catalyst in a solid polymer fuel cell. See Figure 1.

With respect to claim 9, Nolte et al. further teach the fuel cell comprising end plates (separator plates) in the membrane electrode assembly. See Figure 1.

4. The claim rejections under 35 U.S.C.102(e) as being anticipated by Helmer-Metzmann et al. as evidenced by Nolte et al. on claims 1,2,5,6,9,10 are maintained. The rejection is repeated below for convenience.

With respect to claim 1,2,6,10 Helmer-Metzmann et al. teach a polymer electrolyte membrane of polyarylene sulfide having aromatic units. A chlorosulfonated material is suspended in water and the suspension is boiled (a hot water treatment), so that the polyarylene sulfide-sulfonic acid chloride is converted into the polyarylene sulfide-sulfonic acid. See Column 1, Lines 9-61; Column 2, Lines 6-25,64-67. Helmer-Metzmann et al. do not specifically disclose the maximum water absorption in a range of 80-300 weight% based on its dry weight before the hot water treatment. However, it is the position of the examiner that such properties are inherent, given that the materials recited in both Helmer-Metzmann et al. and the present application having similar chemistry and chemical structure. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 5,9, Helmer-Metzmann et al. further teach the polymer electrode membrane can be used in electrochemical cells, in particular in fuel cells and electrolysis cells.

See Column 3, Lines 18-31. The fuel cells inherently comprise electrode and separator plates as evidenced by Nolte et al. See Figure 1.

Claim Rejections - 35 USC § 103

5. The claim rejections under 35 U.S.C.103(a) as being unpatentable over Nolte et al. on claims 3,7,11 are maintained. The rejection is repeated below for convenience.

As discussed in Paragraph 3, Nolte et al. disclose Applicant's invention essentially as claimed, with the exception that the time for hot water treatment is not discussed. However, it would have been within the skill of the ordinary artisan to adjust the length of time for the hot water treatment depending on the degree of purity required for the resulting polymer electrolyte membrane. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

6. The claim rejections under 35 U.S.C.103(a) as being unpatentable over Helmer-Metzmann et al. on claims 3,7,11 are maintained. The rejection is repeated below for convenience.

As discussed in Paragraph 4, Helmer-Metzmann et al. disclose Applicant's invention essentially as claimed, with the exception that the time for hot water treatment is not discussed. However, it would have been within the skill of the ordinary artisan to adjust the length of time for the hot water treatment depending on the degree of purity and sulfonation required for the resulting polymer electrolyte membrane. *Discovery of optimum value of result effective variable*

in known process is ordinarily within skill of art. In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

Allowable Subject Matter

7. Claims 4,8,12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 4,8,12 would be allowable because the prior art does not disclose or suggest the polymer comprising 30-95 mol% of a first aromatic monomer unit represented by the formula (1) and 70-5 mol% of a second aromatic monomer unit represented by the chemical formula (2) as stated in the claim.

Response to Arguments

8. Applicant's arguments filed on February 17, 2004 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) The hot treatment of Nolte in a Soxhlet system is carried out to purify the recovered sulfonated poly(arylene ether sulfones) from the sulfonation of poly(arylene ether sulfones) and is not "a hot water treatment" of the sulfonated poly(arylene ether sulfones);

(b) the suspension that is boiled in Melmer-Metzmann is not believed to be a hot water treatment for the polymer membrane.

In response to Applicant's arguments, please consider the following comments.

(a) The recitation "hot water treatment" in the claims 1,5,9 is interpreted as "a procedure in which a material is exposed to water at a temperature higher than room temperature. Nolte et al. teach of the sulfonated PSU is extracted in a Soxhlet system with hot water (ca. 80°C) for further purification. The yield of the sulfonated PSU from the Soxhlet cup is due to the water solubility of the product at elevated temperatures. See page 213, left column, lines 17-22. Therefore, the limitation of the recitation is encompassed in the teaching of Nolte;

(b) Helmer-Metzmann reference teaches the polymer suspension in water is converted to a polyarylene-sulfide-sulfonic acid by heating at the boiling temperature of water, i.e., 100°C. Thus, the disclosure of Helmer-Metzmann reads on the recitation, hot water treatment, in the claims. Helmer-Metzmann et al. further teach the use of such polymer as membrane in electrolyte capacitors and electrochemical cells because of its excellent proton conductivity. See Column 2, Lines 64-67; Column 3, Lines 18-31.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan
March 29, 2004

A handwritten signature in black ink, appearing to read "Dah-Wei D. Yuan".